BOWSER-MORNER, INC.

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LABORATORY REPORT

AUG 5 2004

Report To: The Payne Firm, Inc.
Attn: Ms. Angela Hurley
11231 Cornell Park Drive
Cincinnati, OH 45242

Date July 26, 2004
Report No. 100346
W.O. No. 131558
No. of Pages: 7

Report On: Laboratory Analysis of One Soil Sample - EMD/Norwood, Ohio
P. O. No. 100.58.19; Chain of Custody No. 122025

On June 29, 2004, one soil sample was submitted for laboratory analysis from the above referenced project. Testing was performed as specified by the client's chain of custody and in accordance with the following procedures:

ASTM D 422,	"Particle-Size Analysis of Soils".
ASTM D 854,	"Specific Gravity of Soils".
ASTM D 2216,	"Laboratory Determination of Water (Moisture) Content of Soil and Rock".
ASTM D 2487,	"Classification of Soils for Engineering Purposes (Unified Soil Classification System)".
ASTM D 4318,	"Liquid Limit, Plastic Limit, and Plasticity Index of Soils".
ASTM D 4972,	"pH of Soils".
ASTM D 5084,	"Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter".
EM-1110-2-1906, (appendix II)	"Unit Weight, Void Ratio, Porosity and Degree of Saturation".

Results are summarized in Table I and detailed on the attached data sheets.

Should you have any questions, or if we may be of further service, please contact me at (937) 236-8805 extension 329.

Respectfully submitted,
BOWSER-MORNER, INC.

Scott D. Ruhkamp

Scott D. Ruhkamp, Manager
Construction Materials and
Geotechnical Laboratories

SDR/slv/ksp
100346
1-Client
1-File
1-Kevin Kallini

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THE PAYNE FIRM, INC.

EMD/Norwood, Ohio - P. O. No. 100.58.19

Chain of Custody. No. 122025

TABLE I
Summary of Results

	MW509B 26.5'-28.0'
Sieve Size (% Passing)	
1"	**100.0**
3/4"	**97.4**
1/2"	**96.8**
3/8"	**95.8**
#4	**92.5**
#10	**88.1**
#20	**83.8**
#40	**79.8**
#60	**73.4**
#100	**66.9**
#200	**61.5**
Liquid Limit:	**25**
Plastic Limit:	**13**
Plasticity Index:	**12**
Gravel, %:	**7**
Sand, %:	**31**
Silt, %:	**42**
Clay, %:	**20**
USCS Classification, Symbol:	**CL**
pH:	**8.5**
Moisture Content, %:	**11.0**
Wet Unit Weight, pcf:	**132.5**
Dry Unit Weight, pcf:	**119.3**
Specific Gravity:	**2.74**
Volume Total (V_t), cm3:	**950.2**
Volume of Solids (V_s), cm3:	**663.3**
Volume of Voids (V_v), cm3:	**286.9**
Porosity (n), %:	**30.2**
Permeability (k), cm/sec:	**2.6×10^{-9}**

Chain of Custody Record

SEVERN TRENT **STL**

Severn Trent Laboratories, Inc.

STL-4124 (0901)

Client: The Payne Firm, Inc.	Project Manager: Don Reed/Results to Angela Hurley	Date: 6/29/04	Chain of Custody Number: 122025
Address: 11231 Cornell Park Dr.	Telephone Number (Area Code)/Fax Number: 513.489.2255/513.489.2533	Lab Number:	Page 1 of 1
City: Cincinnati / State: OH / Zip Code: 45242	Site Contact: ALH	Lab Contact: Scott R.	
Project Name and Location (State): EMD/Norwood, Ohio	Carrier/Waybill Number:		
Contract/Purchase Order/Quote No.: 100.58.19			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: Grain Size	Liquid Limit	Plastic Limit	Plasticity Index	Soil Classification	Moisture	pH	Natural Weight	Dry Unit Weight	Total Volume	Solids Volume	Voids Volume	Special Instructions/ Conditions of Receipt
✓ MW509B/26.5-28/062904	6/29/04	1200				X	X						X	X	X	X	X	X	X	X	X	X	X	X	*ALSO* Porosity Void Ratio Permeability

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal: ☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other normal

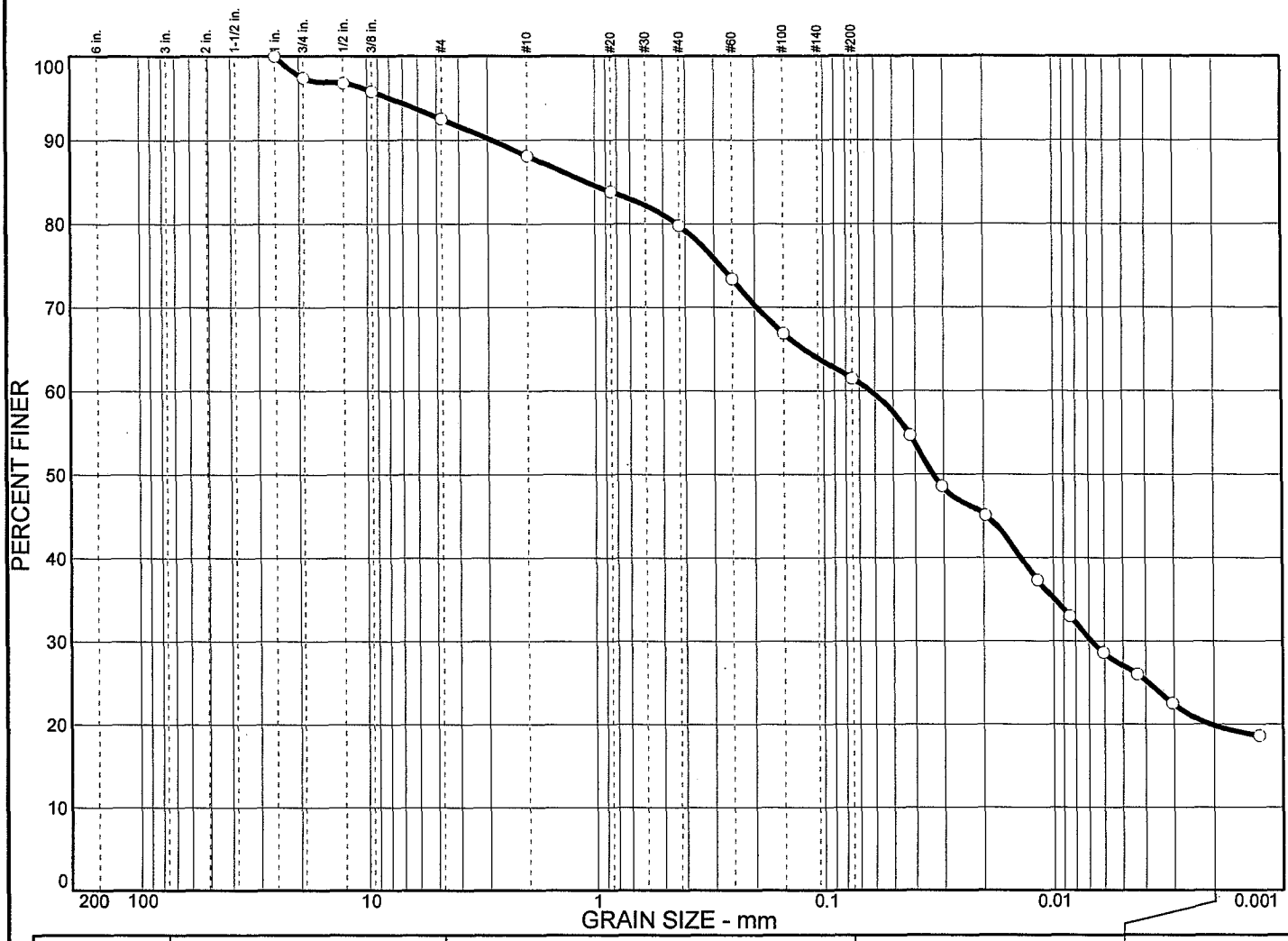
QC Requirements (Specify): Level 4

1. Relinquished By: Angela Hurley	Date: 6/29/04	Time: 1500	1. Received By: Bruce Kirkpatrick	Date: 6-29-04	Time: 1501
2. Relinquished By: Bruce Kirkpatrick	Date: 6-29-04	Time: 1745	2. Received By: SOIL LAB	Date: 6-29-04	Time: 1746
3. Relinquished By:	Date:	Time:	3. Received By:	Date:	Time:

Comments:

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

GRAIN SIZE DISTRIBUTION REPORT



	% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	7.5	31.0	41.7	19.8

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	25	13	1.10	0.0625	0.0334	0.0068				

MATERIAL DESCRIPTION	USCS	AASHTO
○ gray sandy lean CLAY	CL	

Project No. 131558 **Client:** The Payne Firm, Inc.

Project: EMD/Norwood, OH - P.O. No. 100.58.19

○ **Location:** MW509B, 26.5'-28.0'

Remarks:

○

GRAIN SIZE DISTRIBUTION REPORT

BOWSER-MORNER, INC.

GRAIN SIZE DISTRIBUTION TEST DATA

Client: The Payne Firm, Inc.
Project: EMD/Norwood, OH - P.O. No. 100.58.19
Project Number: 131558

Sample Data

Source: MW509B
Sample No.: MW509B
Elev. or Depth: 26.5'-28.0'
Sample Length (in./cm.):
Location: MW509B, 26.5'-28.0'
Description: gray sandy lean CLAY
Liquid Limit: 25
Plastic Limit: 13
USCS Classification: CL
AASHTO Classification:
Testing Remarks:

Mechanical Analysis Data

	Initial
Dry sample and tare=	2062.00
Tare =	227.95
Dry sample weight =	1834.05

Sample split on number 10 sieve
Split sample data:
Sample and tare = 50.28 **Tare =** .00 **Sample weight =** 50.28
Cumulative weight retained tare= .00
Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
1.0 inch	0.00	100.0
.75 inch	48.40	97.4
.50 inch	58.50	96.8
.375 inch	77.76	95.8
# 4	137.09	92.5
# 10	218.08	88.1
# 20	2.48	83.8
# 40	4.73	79.8
# 60	8.41	73.4
# 100	12.08	66.9
# 200	15.20	61.5

Hydrometer Analysis Data

Separation sieve is #10
Percent -#10 based upon complete sample= 88.1
Weight of hydrometer sample: 50.28
Hygroscopic moisture correction:
Moist weight & tare = 50.61
Dry weight & tare = 50.33
Tare = 28.47
Hygroscopic moisture= 1.3 %
Calculated biased weight= 56.35
Automatic temperature correction
Composite correction at 20 deg C = -6.5

Meniscus correction only= 0
Specific gravity of solids= 2.74

Specific gravity correction factor= 0.980
Hydrometer type: 152H
Effective depth L= 16.294964 - 0.164 x Rm

Elapsed time, min	Temp, deg C	Actual reading	Corrected reading	K	Rm	Eff. depth	Diameter mm	Percent finer
1.00	20.0	38.0	31.5	0.0133	38.0	10.1	0.0422	54.7
2.00	20.0	34.5	28.0	0.0133	34.5	10.6	0.0306	48.6
5.00	20.0	32.5	26.0	0.0133	32.5	11.0	0.0197	45.1
15.00	20.0	28.0	21.5	0.0133	28.0	11.7	0.0117	37.3
30.00	20.0	25.5	19.0	0.0133	25.5	12.1	0.0084	33.0
60.00	20.0	23.0	16.5	0.0133	23.0	12.5	0.0061	28.6
120.00	20.0	21.5	15.0	0.0133	21.5	12.8	0.0043	26.0
250.00	20.0	19.5	13.0	0.0133	19.5	13.1	0.0030	22.5
1440.00	21.0	17.0	10.7	0.0131	17.0	13.5	0.0013	18.6

Fractional Components

Gravel/Sand based on #4
Sand/Fines based on #200
% + 3" = **% GRAVEL =** 7.5 **% SAND =** 31.0
% SILT = 41.7 **% CLAY =** 19.8

D_{85}= 1.10 D_{60}= 0.06 D_{50}= 0.03
D_{30}= 0.01

FALLING HEAD PERMEABILITY TEST

ASTM D 5084, Measurement of Hydraulic Conductivity

UNDISTURBED

Client:	**The Payne Firm, Inc.**
Project:	**EMD/Norwood, OH - P.O. No. 100-58-19**
BMI Work Order Number:	131558
Date:	July 22, 2004
Sample Identification:	MW509B
Depth, ft:	26.5-28
USCS Classification:	"CL" gray sandy lean CLAY

SPECIMEN DATA:

Dimension, inches	
Height:	4.256
Diameter:	4.165
Mass, lbs:	4.445
Moisture Content,%	
Initial:	11.0
Final:	11.4
Wet Unit Weight, pcf	
Initial:	132.5
Final:	133.0
Initial Dry Unit Weight, pcf:	119.4
Back Pressure Saturation, psi	
Back Pressure, Exit:	60
Back Pressure, Enter:	65
Lateral Pressure:	71
Permeability (k), cm/sec:	**2.6×10^{-9}**

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